



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,128	02/27/2004	Shin-ichi Uehara	Q80097	4671
23373	7590	08/29/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			CHANG, AUDREY Y	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/787,128

Applicant(s)

UEHARA ET AL.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28,30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28,30 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on June 28, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 1-2, and 4-24, has canceled claim 29 and has newly added claims 30-31.
- Claims 1-28 and 30-31 remain pending in this application.

### *Claim Objections*

**1. Claims 1, 5-8, 21, 25, 2, 9-12, 22, 26 and 4, 17-20, 24 and 28 are objected to because of the following informalities:**

(1). **The amended claim 1 and the newly added claim 30** include the phrase "forming a perpendicular line segment" that is confusing and indefinite since it is not clear the "perpendicular" is measured with respect to what.

(2). **The amended claim 2 and newly added claim 31** include the phrase "the perpendicular distance from a most peripheral line segment out lines segments at the surface of said optical unit to the plane of the viewer's eyes... is set to distance OD" that is really confusing and indefinite since *firstly* it is not clear that *perpendicular* is measured with respect to what. Also what is considered to be the "*most peripheral line segment ... at the surface of said optical unit*"? How can the line segment be *ever at the surface* of the display panel. Judging from Figure 7 of the instant application, the distance "OD" is referred to the *normal distance* between the surface of the optical unit and the plane of the viewer". If the distance is a normal distance between the two, then it does not matters it is measured from which point of the surface of the optical unit.

Art Unit: 2872

(2). The phrase “tan(1’)” recited in claims 2 and 4 is confusing and indefinite since the claims fail to give definition and *physical meanings* to the phrase to make the scopes of the claims clear. *The explicit definition needs to be stated in the claims.*

(3). **The amended phrase** “the distance ... becomes minimum distance ND” recited in claim 4 is confusing and indefinite since it is not clear how does this phrase relate to the phrase “wherein said distance is set to ND” in the following paragraph of the claim.

Claims 5-8, 21, 25, 9-12, 22, 26 and 17-20, 24, 28 inherit the objections from their respective based claims.

**Appropriate correction is required.**

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 5-6 and newly added claim 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Momochi (PN. 5,528,420) in view of the patent issued to Sandor et al (PN. 5,554,432).**

*Claim 1 has been amended significantly which necessitates the new grounds of the rejection.*

Momochi teaches an *apparatus* for outputting image for stereoscopic vision wherein the apparatus comprises a *display panel* having a *plurality of pixels* forming pixels sections each section including a pixel for displaying image for the right eye and a pixel for displaying image for the left eye respectively, (please see Figures 4 and 5). The apparatus further comprises an *optical unit*, such as the a

Art Unit: 2872

*lenticular lens consists a plurality of lenses*, for re-emitting and refracting image light from the display panel or pixels to *right eye and left eye of an observer*, respectively, (please see Figures 6-8). It is implicitly true that the optical unit will establish a three-dimensional visible *range*, which correspond to a three dimensional region that the left eye of the observer will *only* see the left eye image and the right eye of the observer will *only* see the right eye image.

**Claim 1 has been amended** to include the feature having the lens pitch in the optical unit to be *less than 0.2 mm*. This feature is also in the newly added claim 30. Claim 30 further recites that the image display can be held in a viewer's hands. **Momochi et al** teaches that the lenticular lens could have a width of 200 mm and having a total of 1000 lenticular lenses, which means the pitch for each of the lenticular lenses is 0.2 mm, (please see column 10, lines 31-32). But it does not teach explicitly that the lens pitch is less than 0.2mm. **Sandor et al** in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor et al** to modify the stereoscopic image viewing device of **Momochi** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being handheld and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

Momochi further teaches that the pixel sections form *perpendicular line segments* with respect to the normal direction of the display panel, (with regard to the **amendment** to claim 1 and newly added claim 30).

With regard to claim 5, Momochi teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

Art Unit: 2872

With regard to claim 6, Momochi teaches that the optical unit is lenticular lens.

4. Claims 1, 5-8, 21, 25, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487) in view of the patent issued to Sandor (PN. 5,554,432).

*Claim 1 has been significantly amended which necessitates the new grounds of rejection.*

Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

$P = 2l * D/(D+f)$ , (please see equation (1) of column 7), with “2l” denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that,  $D/(D+f)$  is always less than one, and the equation can be rewritten as

$$P < 2l.$$

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is  $\alpha$ , then the following equations for the paraxial light beam will have the

Art Unit: 2872

following equation,  $e/D = \tan(\alpha) = l/f'$ , ( $e$  is shown in Figure 9). Ichinose et al then teaches that  $f' = l \cdot D/e$ , this means:

$\tan(\alpha) = e/D$ , or  $e = D \cdot \tan(\alpha)$ , now  $l$  is much less than  $e$ .

$P < 2l < 2e = 2D \cdot \tan(\alpha)$ . This means the pitch is determined by the relationship of

$P < 2D \cdot \tan(\alpha)$ .

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

$P < 2D \cdot \tan(1')$ , wherein  $D$  could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position).

**Claim 1 has been amended** to include the feature having the lens pitch in the optical unit to be *less than 0.2 mm*. This feature is also in the newly added claim 30. Claims 30 and 31 further recite that the image display can be held in a viewer's hands. **Ichinose et al** does not teach *explicitly* that the lenticular lens has a lens pitch that is less than 0.2mm. However from the equation above it is possible to design the stereoscopic image display with a lens pitch less than 0.2 mm. **Sandor et al** in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor et al** to modify the stereoscopic image viewing device of **Ichinose et al** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being handheld and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

Art Unit: 2872

Ichinose et al further teaches that the pixel sections form *perpendicular line segments* with respect to the normal direction of the display panel, (with regard to the **amendment** to claim 1 and newly added claims 30 and 31).

With regard to claim 5, Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 6-7, Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claim 8, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 21 and 25, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

**5. Claims 2-4, 9-20, 22-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487).**



Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

$P = 2l * D/(D+f)$ , (please see equation (1) of column 7), with “2l” denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that,  $D/(D+f)$  is always less than one, and the equation can be rewritten as

$$P < 2l.$$

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is  $\alpha$ , then the following equations for the paraxial light beam will have the following equation,  $e/D = \tan(\alpha) = l/f$ , (e is shown in Figure 9). Ichinose et al then teaches that  $f = l * D/e$ , this means:

$$\tan(\alpha) = e/D, \text{ or } e = D * \tan(\alpha), \text{ now } l \text{ is much less than } e.$$

$$P < 2l < 2e = 2D * \tan(\alpha). \text{ This means the pitch is determined by the relationship of}$$

$$P < 2D * \tan(\alpha).$$

Art Unit: 2872

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

$P < 2D * \tan(1')$ , wherein  $D$  could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position.

**The amendment to claim 2**, concerning the perpendicular distance between the surface of the optical unit and the plane of the viewer's eyes is included in the distance "D" stated above.

**The amendment to claim 4**, concerning the minimum viewing distance "OD" between the surface of the optical unit and the plane of the viewer's eyes is included in the range of distance "D" stated above.

This reference has met all the limitations of the claims. With regard to claims 3 and 4, this reference however does not teach explicitly that the lens pitch assumes the values of 0.124 mm or less or if the distance within the three dimensional visible range, (for either minimum distance or optimum viewing position) to be the ranges of claimed, (i.e., 213 mm or less or 350 mm or less). However, with the general equations being defined by Ichinose et al, it would have been obvious to one skilled in the art to plug in the desired values to design an image display device satisfies the specific sizes for the benefit of allowing the display devices to be applicable for different application requirements.

With regard to claims 9, 13, and 17 Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 10-11, 14-15 and 18-19, , Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one

Art Unit: 2872

dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claims 12, 16 and 20, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 22-24, and 26-28, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

### ***Response to Arguments***

Applicant's arguments filed on June 28, 2005 have been fully considered but they are not persuasive. The newly amended claims and newly added claims have been fully considered and they are rejected for the reasons stated above.

Applicant's arguments drawn to the newly amended and newly added features have been fully addressed in the paragraphs above.

With regard to applicant's arguments concerning the specific viewing distance being 350 mm or 213 mm are not explicitly taught by the cited reference Ichinose et al, which therefore is patentably distinct from the cited reference the examiner respectfully disagrees since the cited reference has explicitly taught the *general relationship* between the normal viewing distance to the optical unit and the pitch of the optical unit for allowing stereoscopic view, it would have been *within general skill in the art* to obtain the optimum viewing distance corresponding to the physical size and design of the optical unit as *desired* to make the display device with desired size. It has been held when the **general conditions** of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine

Art Unit: 2872

skill in the art. In re Aller, 105 USPQ 233. It also has been held that the change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

*Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

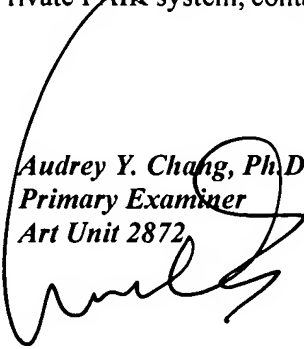
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2872

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Audrey Y. Chang, Ph.D.*  
*Primary Examiner*  
*Art Unit 2872*



A. Chang, Ph.D.